lower Cosumnes River that are set close to the active channel. These levees are substandard and were breached in 14 locations during the January 1997 flood. Levee and channel maintenance often requires riparian vegetation removal.

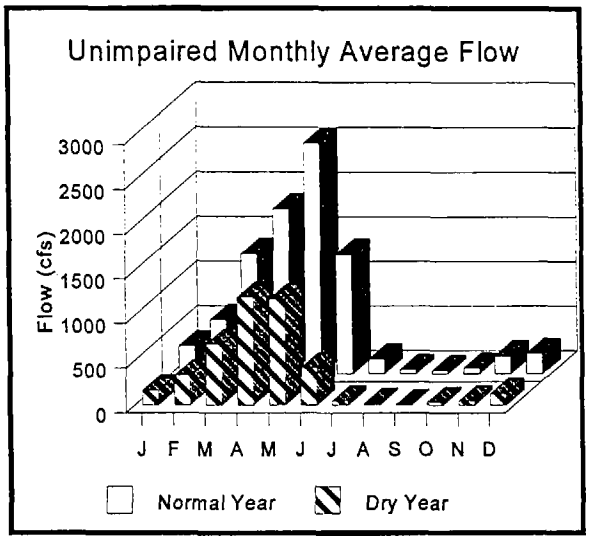
MOKELUMNE RIVER ECOLOGICAL MANAGEMENT UNIT

The Mokelumne River, the largest eastside Delta tributary, drains approximately 661 square miles, with its headwaters at 10,000 elevation feet on the Sierra Nevada crest. Downstream of the town of Thornton, the river splits into the North and South Fork channels. The Delta Cross Channel and Georgiana Slough divert water from the Sacramento River into the North Fork Mokelumne River channel. The river enters the lower San Joaquin River northwest of Stockton. The median historical unimpaired runoff is 696,000 acre-feet (af), with a range of 129,000 to 1.8 million af.

The Mokelumne River has had a long history of water development. Three major impoundments in the watershed, with a combined storage capacity of more than 750,000 af (Camanche, Pardee, and Salt Springs reservoirs), now control releases to the lower Mokelumne River. In 1929, East Bay Municipal Utility District (EBMUD) constructed Pardee Reservoir and the Mokelumne Aqueduct to supply water to 1.2 million people living in 20 cities and 10 unincorporated areas in Contra Costa and Alameda counties. The reservoir has a capacity of 197,590 af and the aqueduct can carry about 500 cfs from Pardee Reservoir. Camanche Dam, constructed in 1964 by EBMUD, is now the upstream boundary for anadromous fish migration.

Camanche Reservoir, with a capacity of approximately 417,120 af, provides seasonal storage for downstream diversions and instream flows. Downstream of Camanche Reservoir, developments include both hydroelectric and irrigation facilities. At Lodi, the Woodbridge Diversion Dam supplies water to the eastern Delta agricultural area.

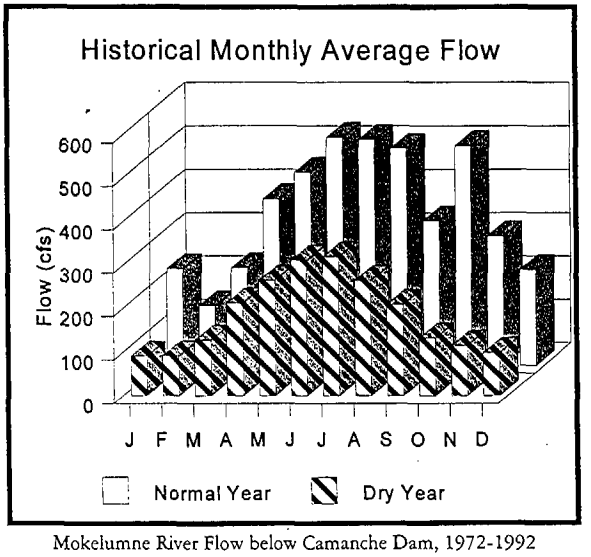
The natural Mokelumne River streamflow pattern is typical of streams in the central Sierra, with high spring flows, very low summer and fall flows, and moderate winter flows. Total annual inflow also varies greatly. Peak inflows occur in April and May. In years with the highest rainfall, average monthly



Mokelumne River Unimpaired Streamflow at Pardee, 1972-1992 (Dry year is the 20th percentile year; normal year is the 50th percentile or median year.)

inflows range from 4,000 to 6,000 cfs from January through June, but from only 200 to 500 cfs in August and September. In driest years, inflows peak at only 600 to 1,000 cfs in April and May, while summer and fall inflows are 0 cfs, and winter inflows are only 30 to 150 cfs. Typical average monthly spring inflows in dry and normal years range from 500 to 2,500 cfs.

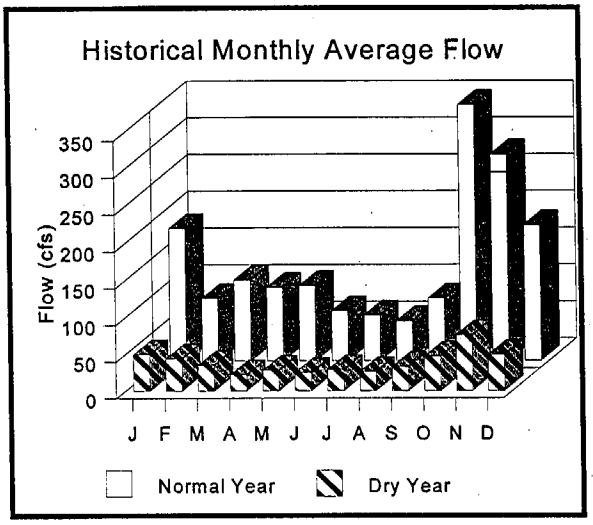
Pardee and Camanche Dams have markedly changed streamflow in the lower Mokelumne River below Camanche Dam. Winter and spring flows have been greatly reduced in all but high rainfall years, while summer and fall flows have increased. Flows in years



Mokelumne River Flow below Camanche Dam, 1972-1992 (Dry year is the 20th percentile year; normal year is the 50th percentile or median year.)

with the highest rainfall range from 1,400 to 2,800 cfs in summer and fall, and from 2,700 to 5,100 cfs in winter and spring. In driest years, spring and summer flows range from 120 to 250 cfs, while fall and winter flows range from 30 to 90 cfs.

Spring flows in dry years have declined from the 400 to 1200 cfs range to the 100-300 cfs range. Normal rainfall year spring flows have declined from the 1,400 to 2,600 cfs range to the 200-500 cfs range.

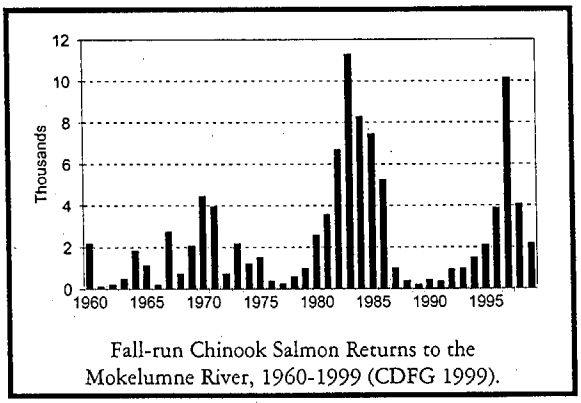


Lower Mokelumne River Flow at Woodbridge, 1972-1992 (Dry year is the 20th percentile year; normal year is the 50th percentile or median year.)

Irrigation diversions along the Mokelumne River below Camanche Dam reduce the flow in the river during the irrigation season, typically late March through October. The largest diversion is at Woodbridge Diversion Dam near Lodi, approximately 15 miles upstream from the Delta. Streamflow below Woodbridge Diversion Dam is low in all but wet years, which is similar to the historic flow pattern in the lower Mokelumne River in late summer and fall. In driest years, monthly average flows range from 5 to 40 cfs. Average monthly flows in dry years range from 20 to 80 cfs. In normal flow years, spring and summer flows range from 50 to 100 cfs. Fall flows in normal to wet years range from approximately 200 to 800 cfs.

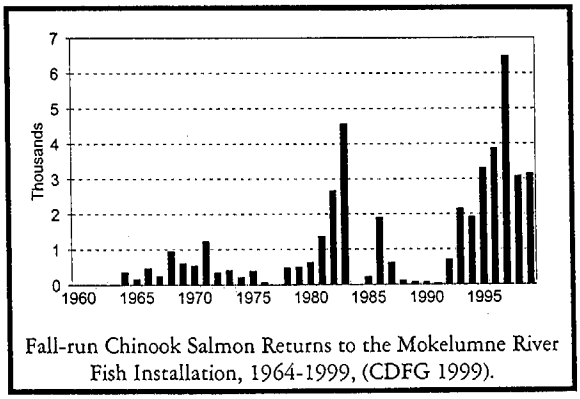
Fall-run chinook salmon and steelhead occur in the Mokelumne River below Camanche Dam. American shad and striped bass also occur in the river below Woodbridge Irrigation Dam. Highly variable flow and habitat conditions in the lower river have resulted in widely varying population levels of all these species. Before the completion of Camanche Dam in 1964, chinook salmon spawned primarily between the town of Clements and the canyon about 3 miles below Pardee Dam, with a few fish spawning upstream in the canyon below Pardee Dam and downstream between Clements and Lockeford.

Mokelumne River chinook salmon and steelhead populations have failed to consistently achieve population levels believed possible following the completion of Camanche Dam. The fall-run chinook salmon population reached a peak of slightly more than 11,000 in 1983, but declined to less 410 spawners in 1991. (Note: The 11,000 spawner estimate is not considered a reliable estimate as it was the result of an extrapolation of a hatchery vs naturally spawning chinook escapement regression line.) Since the 1987 through 1992 drought, the population rebounded to about 10,000 spawners in 1997.



Fall-run Chinook Salmon Returns to the Mokelumne River, 1960-1999 (CDFG 1999).

Presently, the majority of salmon spawning takes place in the 5 miles between Camanche Dam and Mackville Road, with 95% of the suitable spawning habitat within 3.5 miles of the dam. Instream flow releases following the completion of Camanche Dam



Fall-run Chinook Salmon Returns to the Mokelumne River Fish Installation, 1964-1999, (CDFG 1999).

provided insufficient habitat for anadromous fish spawning, rearing, and outmigration. Water temperature in the Mokelumne River below Camanche Dam, which is important for steelhead rearing, changes downstream because of flow releases from the dam.

The California Department of Fish and Game (DFG) (1993) recommended substantial increases in flow releases, with specific monthly flows in wet, normal, and dry years ranging from approximately 100 cfs to 450 cfs, along with temperature objectives during the summer steelhead rearing period. The U.S. Fish and Wildlife Service (USFWS 1997) recommended evaluation of spring flows to assist the outmigration of juveniles. USFWS (1997) also recommended improving fish passage at Woodbridge Dam and replenishing spawning gravels. However, neither flow recommendation was based on modeling results that considered water supply, water quality, and water temperatures.

EBMUD prepared a comprehensive management plan for the lower Mokelumne River in 1992 that includes additional instream flows and non-flow enhancement components. The Plan was implemented voluntarily by EBMUD in 1993 and the Plan was further improved by implementing components of the Joint Settlement Agreement among EBMUD, CDFG, and USFWS in 1998.

Unscreened or poorly screened diversions along the lower Mokelumne River contribute to the poor salmon and steelhead production on the river. Juvenile salmon and steelhead losses occur at the Woodbridge Irrigation District water diversion at Woodbridge Canal due to inadequate screening. The North San Joaquin Water Conservation District diversion, the second largest single diversion below Camanche Dam, is unscreened. There are also numerous unscreened small irrigation diversions on the lower Mokelumne River.

Woodbridge Dam also provides conditions for predators, such as birds, squawfish, and striped bass, to prey on juvenile salmonids that pass downstream over the dam or through the fish ladder. The dam also impedes upstream adult salmon and steelhead passage.

The amount and condition of spawning and rearing habitat below Camanche Dam may limit the chinook salmon and steelhead populations, although based upon the results of fisheries monitoring studies conducted since 1991, EBMUD has seen no evidence that rearing habitat is limiting in the lower Mokelumne River. Spawning habitat for chinook salmon and steelhead is limited below Camanche Dam, because gravel transport down the river has been disrupted by Camanche and Pardee Dams. Also, the stream channel has become armored in a few places, but the presence of salmon redds in the same locations year after year suggests that armoring is a minor problem. The river supported 3,892 chinook salmon spawners in 1996 and gravel restoration since 1990 has increased the carrying capacity by 300 spawning female salmon (Setka 1997). Rearing habitat suffers from a lack of riparian shade vegetation and cover. There has also been a significant loss of riparian and riverine aquatic vegetation along the lower river. In many years, including dry years, water temperatures are purposely increased by drawing water off the epilimnion to provide optimum salmonid rearing temperatures downstream of Camanche Dam. This is done to increase growth rates and speed smoltification so chinook salmon will move through the Delta before being affected by high late spring water temperatures in the Delta.

As mitigation for the loss of spawning habitat between Camanche and Pardee Dams, EBMUD constructed a hatchery below Camanche Dam. The river below the hatchery was expected to provide habitat for 5,000 chinook salmon and the hatchery would produce 100,000 steelhead. From 1964 through 1988, the hatchery received an average annual return of 490 adult salmon and 28 adult steelhead. This has improved in recent years with an average annual hatchery return of 1,528 chinook salmon during 1989-1996.

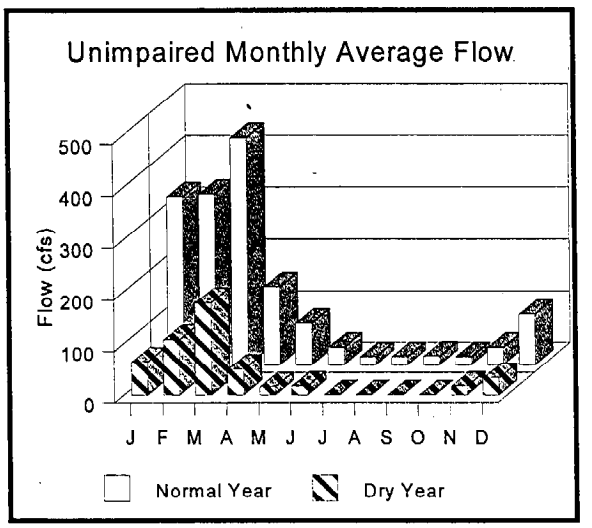
Calaveras River Ecological Management Unit

The Calaveras River enters the San Joaquin River at Stockton, draining approximately 362 square miles in the foothills south of the Mokelumne River with an average annual runoff of 166,000 af. The river flows through Stockton and enters the San Joaquin River channel in the Delta. The ecological unit includes the lower Calaveras River from New Hogan Dam to the confluence with the lower San Joaquin River.

Flows on the Calaveras River are controlled by New Hogan Dam, constructed in 1964 by the U.S. Army Corps of Engineers (Corps) and operated by the U.S. Bureau of Reclamation (Reclamation). The conservation yield from the reservoir, with a gross pool capacity of approximately 325,000 af, is contracted for municipal and agricultural use to Calaveras County Water District and Stockton East Water District. The dam and reservoir are located in western Calaveras County near the town of Valley Springs.

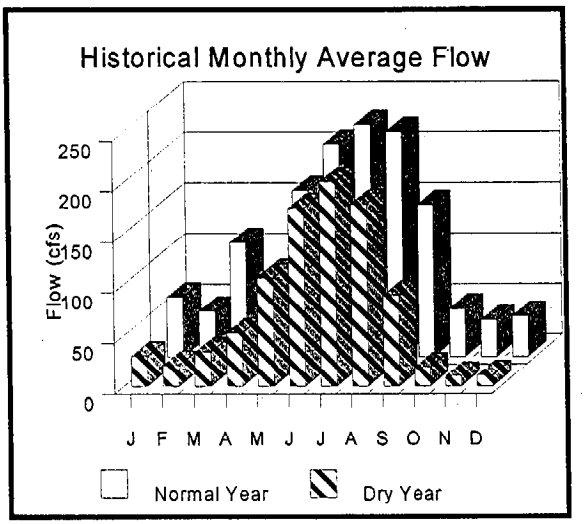
The Calaveras River drainage is almost entirely below the effective average snow level; therefore, the area receives runoff primarily as rainfall. About 93% of the runoff occurs from November to April. The valley portion of the river historically experienced frequent periods of low or no flow in late summer and early fall. However, deep pools in the approximately 6-mile reach from the dam to the town of Jenny Lind now provide suitable summer holding areas for salmon and resident trout in all but the driest years.

The monthly unimpaired flow pattern for the river is typical of Sierra foothill streams, with most rainfall coming in winter. Streamflow varies considerably from year to year with rainfall variations. The average annual streamflow is 240 cfs with the peak average monthly flows of 3,000 cfs in winter of wettest years. Summer and early fall flows are very low, and the channel is dry from July through October in low rainfall years.



Calaveras River Unimpaired Streamflow at Jenny Lind, 1970-1990
(Dry year is the 20th percentile year; normal year is the 50th percentile or median year.)

Historical flow data below New Hogan Dam indicate a shift of the natural runoff pattern to irrigation season releases from May through September, with a slight decrease in the average flow (220 cfs) caused by evaporation and upstream diversions. Because of the relatively large capacity of New Hogan reservoir, non-irrigation releases (spills) are confined to wet years. In the highest rainfall years, average monthly flows range from 1,400 to 2,800 cfs from November through April. Irrigation season releases generally range from 150 to 250 cfs, except in the driest years, when releases only average 60 to 80 cfs from May through August. Non-irrigation season minimum flows are generally 30 to 90 cfs, except in drier years, when they average only 30 cfs or less.



Lower Calaveras River Streamflow below New Hogan Dam, 1970-1990 (Dry year is the 20th percentile year; normal year is the 50th percentile or median year.)

Although winter-run chinook salmon were known to occur irregularly in the Calaveras River, this stock is not a focus of restoration in this ecological management zone. The Ecosystem Restoration Program (ERP) focuses on restoring or re-creating ecological processes that support sediment supply, stream channel meander, and riparian and riverine aquatic habitat and eliminating or reducing stressors. Together, the actions proposed for the Calaveras River Ecological Unit will benefit fall-run chinook salmon and other fish, wildlife, and plant resources. New Hogan Dam operations may have increased the frequency of salmon runs into the Calaveras River, despite no requirements for minimum flow releases. Since the completion of the New Hogan project, returns of winter-run chinook salmon to the river were documented in 1972, 1975, 1976 (tidewater

only), 1978, 1982 (tidewater only), and 1984. Physical habitat conditions are adequate for salmon spawning and rearing, which includes abundant spawning gravel and a dense riparian canopy. Streamflow is the principal limiting factor.

Another limiting factor is loss of juvenile salmon into water diversions downstream of New Hogan Dam. Stockton East Water District's diversion is presently unscreened. There are several other unscreened diversions along the river.

Diversion channels that carry Calaveras River water and act as migratory routes for salmon below Bellota Dam include the original Calaveras River channel, Mormon Slough, and the Stockton Diverting Canal. In some years, typically in March, partial or complete blockage of adult salmon migration coincides with placing approximately 30 temporary irrigation dams in these channels. Adult salmon are prevented from reaching deep pools and spawning gravel above Bellota Dam and are subject to poaching below the flashboard dams. Two of the diversion structures, Clements Dam and Cherryland Dam, have been identified as barriers to salmon movement. The Bellota Dam (weir) blocks upstream salmon migrants at flows below approximately 200 cfs.

VISION FOR THE ECOLOGICAL MANAGEMENT ZONE

The vision for the Eastside Delta Tributaries Ecological Management Zone is to improve the values of the rivers and riparian zones as fish and wildlife corridors from the delta to the upland and upstream habitats; restore tidal wetlands; create and maintain permanent freshwater marshes, seasonal wetlands, floodplain habitat, spawning areas for splittail, and rearing, spawning, foraging habitat for fall-run chinook salmon and steelhead, habitat for the giant garter snake. Elements to reach this vision include improved streamflow patterns and water temperatures, reconnecting the river with its floodplain, restoring riparian and riverine aquatic habitat, reducing loss of salmon and steelhead and other young fish at unscreened diversions, and reducing fish passage problems at diversion dams. Ecological health will be attained when levees are modified to allow seasonal floodplain inundation; chinook salmon and steelhead populations reach target levels; habitat is improved for resident native fishes, sandhill cranes, and migratory waterfowl; migration corridors are improved for aquatic and terrestrial species; and riparian and stream channel habitats are restored.

The vision focuses on improving streamflows and stream channel and gravel recruitment processes needed to support habitat for anadromous salmonids and other fish species. It also focuses on restoring tidal wetlands, floodplains, seasonal floodplain inundation, and natural flood regimes. On the lower Mokelumne River, restoration will focus on habitat for fall-run chinook salmon and steelhead. On the Calaveras River, the emphasis will be on providing the opportunity for fall-run chinook salmon to spawn successfully and providing juveniles the opportunity to emigrate from the system successfully. On the Cosumnes River, the focus will be on restoring floodplain processes, seasonally flooded habitat, tidal wetlands, splittail and chinook salmon rearing habitat, sandhill crane habitat, and establishing an extensive riparian and riverine aquatic corridor. Throughout the basin, restoring and protecting a self-sustaining, diverse riparian community will be emphasized to maintain nutrient and woody debris input to the aquatic system, enhance bank stability and stream shading, and provide valuable habitat for a variety of wildlife species.

The ERP envisions that the fish, wildlife, and riparian needs of the East Delta Tributaries Ecological Management Zone will be met and an acceptable level of ecosystem health will be achieved when the following visions have been satisfactorily attained.

VISIONS FOR ECOLOGICAL MANAGEMENT UNITS

COSUMNES RIVER ECOLOGICAL MANAGEMENT UNIT

The vision for the Cosumnes River Ecological Unit is to restore floodplains, seasonally flooded habitat, tidal wetlands, splittail and chinook salmon rearing habitat, sandhill crane habitat, and a riparian plant community. The fall-run chinook salmon population can be sustained through improvements in streamflow, channel and floodplain morphology, spawning and rearing habitat, fish passage at diversion dams, and reducing losses to unscreened diversions and illegal harvest.

The vision for the Cosumnes River includes improved streamflow and riparian habitat, modified floodplain and channel conditions, reduced fish passage problems and unscreened diversions. These actions will improve habitat conditions for fall-run chinook salmon and other wildlife species. The flow regime is the primary factor affecting the size of the Cosumnes River salmon run. In drier years, the early portion of the run experiences difficulty negotiating the shallow bar and shoal areas.

Although there are only minor water storage reservoirs on the Cosumnes River, streamflows are reduced by numerous small water diversions and the lowering groundwater table. Most water is diverted from the first rains in the fall through early summer, coinciding with instream flow needs for fall-run chinook salmon. Minimum instream flow during the salmon spawning and rearing season may be needed. Additional streamflow is needed in dry and normal years to ensure survival of downstream migrating juvenile salmon.

Also important to restoration will be removing existing levees and constructing set back levees, implementing improved land management and livestock grazing practices along stream/riparian zones, fish passage improvements at small dams, screening water diversions, and improving gravel recruitment and riparian habitats.

Riparian and aquatic habitat quality and distribution will be improved by expanding the width of the river floodplain through a program of levee setbacks. In combination with other efforts to improve floodplain safety and levee management on the lower Cosumnes River, levee setbacks will allow natural river meanders to form and associated habitats to thrive. Greater floodplain width between levees reduces the need for channel straightening and bank armoring at the expense of aquatic and riparian habitat. Floodplain land could continue to be farmed within the levees, or conservation easements could be acquired to expand riparian forest and seasonal wetland habitats along the river.

Sandhill crane roosting and foraging habitat in the lower Cosumnes River will be protected by land acquisition through in-fee purchase or easement.

MOKELUMNE RIVER ECOLOGICAL MANAGEMENT UNIT

The vision for the Mokelumne River Ecological Unit is to support self-sustaining fall-run chinook salmon and steelhead populations by improving streamflows, riparian and SRA habitat, natural sediment supply and gravel recruitment, and fish passage; reducing predation and illegal harvest; eliminating unscreened and poorly screened diversions; and improving and upgrading hatchery facilities and management strategies.

The vision for the Mokelumne River includes improved streamflow, gravel recruitment, floodplain configuration, fish passage, salmon spawning and rearing habitat, riparian habitat, screening of diversions, and enforcement of fishing regulations. Under this vision, the Mokelumne River would better support naturally spawning steelhead trout, fall-run chinook salmon, American shad, and resident native fishes. For the Mokelumne River, this means improving flows from spring through fall below Camanche and Woodbridge dams. Higher and more natural flows will help steelhead move upstream during the late fall and early winter. Higher flows will benefit downstream migrating juvenile fall-run chinook salmon and steelhead, as well as juvenile salmon and steelhead migrating out of the Sacramento and San Joaquin Rivers and their tributaries through the Delta. These flows will also benefit stream channel and riparian vegetation processes in the lower river, which in turn will benefit the fish.

Habitat improvements in the lower Mokelumne River will improve natural production of these same anadromous fish. Improved spawning habitat will increase young salmon and steelhead production. Improved stream channel and riparian vegetation will increase juvenile salmon and steelhead survival. Floodplain stream channel and habitat improvements will also benefit salmon and steelhead by providing valuable seasonal rearing habitat.

CALAVERAS RIVER ECOLOGICAL MANAGEMENT UNIT

The vision for the Calaveras River Ecological Unit is to restore and maintain important ecological processes that support a sustainable migration corridor for fall-run chinook salmon and other

terrestrial and aquatic species and their upstream habitat.

The vision for the Calaveras River includes improved streamflow, gravel recruitment, floodplain configuration, fish passage, riparian and stream channel habitat, screening of diversions, and enforcement of fishing regulations. Proper conditions will maintain more consistent fall-run chinook runs.

Restoring instream flows adequate to maintain anadromous fish habitat will be the focus element. Maintaining an adequate water temperature regime, improving fish passage at irrigation dams, and reducing entrainment at water diversions will also be important.

Physical habitat conditions are adequate for salmon spawning and rearing, including abundant spawning gravel and a dense riparian canopy. With appropriately timed flows and other improvements, fall-run chinook salmon could be maintained more consistently.

VISIONS FOR ECOLOGICAL PROCESSES

CENTRAL VALLEY STREAMFLOWS: Instream flows are inadequate and need to be supplemented where possible, consistent with existing agreements. Increased flows would help restore ecological processes and functions that maintain habitats for important aquatic and terrestrial species. The vision is that instream flows will be at levels and mimic natural flow regimes that support restored ecological processes and functions that maintain important fish, wildlife, and plant communities and their habitats.

COARSE SEDIMENT SUPPLY: The input of sediments into the riverine systems below major dams is inadequate to maintain ecological health. The vision is that gravel recruitment, transport, and cleansing processes will be restored, reactivated, or supplemented to a level that supports habitat for anadromous and other native fish populations and sustains self-regenerating riparian and riverine plant communities.

NATURAL FLOODPLAIN AND FLOOD PROCESSES: Natural river-floodplain interaction has been impaired by the construction of dams and levees. This seasonal inundation is needed to promote ecological health and restoration of important species. The vision is that floodplains along the Cosumnes, Mokelumne, and Calaveras rivers will be expanded, reconnected to their channels, and seasonally inundated by increased stream flows. These actions will support natural riparian regeneration and nutrient input to the Delta and help create seasonal habitat for splittail spawning and the rearing and emigration of juvenile fish.

CENTRAL VALLEY STREAM TEMPERATURES: High stream temperatures limit or interrupt the natural life cycle of aquatic organisms. The vision is that water temperatures below major dams will be suitable for maintaining important aquatic organisms and biological functions, such as chinook salmon and steelhead spawning, egg development, and fry and juvenile rearing and emigration.

VISIONS FOR HABITATS

SEASONAL WETLAND HABITAT: The vision is that increased seasonal flooding of leveed lands, use of the Zones natural flood detention capacity, protection and enhancement of existing wetlands, and development of cooperative programs with local landowners will contribute to increased habitats for waterfowl and other wetland dependent fish and wildlife resources such as shorebird, wading birds, and the giant garter snake.

RIPARIAN AND RIVERINE AQUATIC HABITATS: Riparian plant communities are important to a healthy ecosystem and contribute in many ways to sustaining fish and wildlife populations. The vision is to restore diverse, self-sustaining riparian and shaded riverine aquatic habitat along the lower reaches of the Cosumnes, Mokelumne, and Calaveras rivers.

FRESHWATER FISH HABITAT: Freshwater fish habitat is an important component needed to ensure the sustainability of resident native and anadromous fish species. The streams of the Eastside Delta Tributaries Ecological Management Zone are typical of a fall chinook salmon spawning stream (Moyle and Ellison 1991). The quality of freshwater fish habitat in these streams will be maintained through actions directed at streamflows, coarse sediment supply, stream meander, natural floodplain and flood processes, and maintaining and restoring riparian and riverine aquatic habitats.

ESSENTIAL FISH HABITAT: The Mokelumne, Cosumnes, and Calaveras rivers have been identified as Essential Fish Habitat (EFH) based on the definition of waters currently or historically accessible to salmon (National Marine Fisheries Service 1998). Key features of EFH to maintain or restore in these streams include substrate composition; water quality; water quantity, depth and velocity; channel gradient and stability; food; cover and habitat complexity; space; access and passage; and flood plain and habitat connectivity.

VISION FOR REDUCING OR ELIMINATING STRESSORS

WATER DIVERSIONS: The vision is to contribute to adult fish survival and return by reducing the loss of juvenile aquatic organisms into water diversions and lessen the impact of water diversion on the elevation of the water table.

DAMS AND OTHER STRUCTURES: The vision is to contribute to restoring chinook salmon and steelhead by improving up- and downstream fish passage at diversion structures.

INVASIVE RIPARIAN AND MARSH PLANTS: The vision is to support riparian regeneration by controlling invasive (non-native) plants so that they do not impair efforts to restore natural riparian and riverine plant communities.

PREDATION AND COMPETITION: The vision is to contribute to restoring naturally spawning chinook salmon and steelhead populations by modifying hatchery practices and instream structures to reduce rates at which juvenile salmonids fall prey to predators.

CONTAMINANTS: The vision is to reduce fish and wildlife losses due to pesticides, hydrocarbons, heavy metals, and other toxins and contaminants.

HARVEST OF FISH AND WILDLIFE: The vision is to contribute to restoring important resident, estuarine, and anadromous fish species by managing legal and illegal harvest to protect naturally spawning fish.

ARTIFICIAL PROPAGATION OF FISH: The vision is to improve and balance natural chinook salmon and steelhead production in the Mokelumne River with hatchery produced populations.

VISIONS FOR SPECIES

SPLITTAIL: The vision for splittail is to recover this federally listed threatened species. The vision is to contribute to splittail restoration by improving the riparian and stream meander corridors and natural floodplains along the Cosumnes and Mokelumne Rivers. The value of the seasonal habitat will be improved by late-winter and early-spring streamflows to provide attraction flows for spawning adults and increased spawning habitat.

CHINOOK SALMON: The vision for chinook salmon is to recover all stocks presently listed or proposed for listing under ESA or CESA, achieve naturally spawning population levels that support and maintain ocean commercial and ocean and inland recreational fisheries, and that use fully existing and restored habitats. The vision is to assist in fall-run chinook salmon restoration by:

improving streamflows for passage, spawning, rearing, and emigration,

- improving gravel recruitment,
- providing water temperatures needed for successful egg incubation and rearing,
- increasing riparian and riverine aquatic habitat,
- reducing or eliminating unscreened diversions and sources of contaminants, and
- operating Mokelumne River Fish Facility to improve and protect naturally spawning fish.

STEELHEAD TROUT: The vision for steelhead trout is to recover this species listed as threatened under ESA and achieve naturally spawning populations of sufficient size to support inland recreational fishing and that use fully existing and restored habitats. The vision is to assist in of steelhead trout restoration by:

- improving streamflows for passage, spawning, rearing and emigration,
- improving gravel recruitment,
- providing water temperatures needed for successful egg incubation and rearing,
- increasing riparian and riverine aquatic habitat,

- reducing or eliminating unscreened diversions, sources of contaminants, and
- operating Mokelumne River Fish Facility to improve and protect naturally spawning fish.

NATIVE RESIDENT FISH SPECIES: The vision for resident fish species, including hitch and hardhead, is to increase their abundance and distribution by implementing actions to improve stream channel, floodplain, and riparian processes.

LAMPREY: The vision for Pacific and river lamprey is to maintain the diversity, distribution and abundance of these species.

WHITE STURGEON: The vision for white sturgeon is to maintain and restore population distribution and abundance to historical levels and support a sport fishery. Improved flows and stream channel and floodplain processes will benefit sturgeon populations through improved habitat and food supply. Higher peak late winter and spring flows will provide attraction for adult sturgeon moving upstream from the lower rivers, Delta, Bay, and ocean. Stream channel improvements will provide greater amounts and improved quality of spawning and early rearing habitat.

GIANT GARTER SNAKE: The vision for giant garter snake is to contribute to the recovery of this State and federally listed threatened species in order to contribute to the overall species richness and diversity. The vision for giant garter snake is to maintain or expand existing populations by improving stream channel, floodplain, riparian processes, and reducing predator species.

WESTERN POND TURTLE: The vision for the western pond turtle is to maintain and restore their abundance and distribution by maintaining or expanding existing populations by improving stream channel, floodplain riparian processes, and reducing predator species.

CALIFORNIA RED-LEGGED FROG: The vision for the California red-legged frog is to maintain populations of this federally listed threatened species. Protecting existing and restoring additional suitable aquatic, wetland, and riparian habitats and reducing mortality from non-native predators will be critical to achieving recovery of the California red-legged frog.

CALIFORNIA TIGER SALAMANDER: The vision for the California tiger salamander is to maintain existing populations of this Federal candidate species in the Bay-Delta. Protecting and restoring existing and additional suitable aquatic, wetland, and floodplain habitats and reducing the effect of other factors that can suppress breeding success will be critical to the recovery of the California tiger salamander.

WESTERN SPADEFOOT: The vision for the western spadefoot is to maintain this California species of special concern in the Bay-Delta. Protecting and restoring existing and additional suitable aquatic, wetland, and floodplain habitats and reducing the effect of other factors that can suppress breeding success will be critical to the recovery of the western spadefoot.

SWAINSON'S HAWK: The vision for Swainson's hawk is to contribute to the recovery of this State-listed threatened species. The vision for Swainson's hawk is that actions in the Eastside Delta Tributaries Ecological Management Zone to improve nesting and foraging habitat will contribute to overall species recovery.

GREATER SANDHILL CRANE: The vision for the greater sandhill crane is to contribute to the recovery of this California species of special concern. The vision includes contributing to their recovery by improving foraging and resting habitat.

WESTERN YELLOW-BILLED CUCKOO: The vision for the western yellow-billed cuckoo is to contribute to recovery of this State-listed endangered species. Improvements will result from efforts to protect, maintain, and restore riparian and riverine aquatic habitats throughout the Eastside Delta Tributaries Ecological Management Zone.

NEOTROPICAL MIGRATORY BIRDS: The vision for the neotropical migratory bird guild is to restore and maintain healthy populations of neotropical migratory birds through restoring habitats on which they depend. Protecting existing and restoring additional suitable wetland, riparian, and grassland habitats will be critical to maintaining healthy neotropical migrant bird populations in the Eastside Delta Tributaries Ecological Management Zone. Large-scale restoration of nesting habitats will help reduce nest parasitism and predation by creating

habitat conditions that render neotropical birds less susceptible to these stressors.

WATERFOWL: The vision for waterfowl is to maintain and restore healthy populations at levels that can support consumptive (e.g., hunting) and nonconsumptive (e.g., birdwatching) uses. Many species of resident and migratory waterfowl will benefit from improved aquatic, wetland, riparian, and agricultural habitats. Increase use of the Eastside Tributaries Ecological Management Zone. Improved seasonal wetlands and floodplain/stream interactions will be beneficial not only to waterfowl but other fish and wildlife resources.

PLANT SPECIES AND COMMUNITIES: The vision for plant species and communities is to protect and restore these resources in conjunction with efforts to protect and restore wetland and riparian and riverine aquatic habitats. This vision includes such key communities as floodplain dependent species such as California hibiscus, button-bush thickets, and native grasslands.

INTEGRATION WITH OTHER RESTORATION PROGRAMS

Attaining the vision for the Eastside Delta Tributaries Ecological Management Zone includes near-term funding and implementing actions to achieve the targets. This includes managing water project operations, purchasing in-title or land easements from willing sellers, cooperatively developing and implementing a phased fish screening program, acquiring and placing gravel in the stream channel, and the performing engineering feasibility and design studies to improve fish passage at diversion structures.

Along with the near-term actions, the vision includes cooperation and support of existing ecosystem and species restoration efforts and programs. Parallel efforts include developing and integrating local land use plans that embrace and foster the objectives of ERPP.

Long-term efforts that will enhance the vision for the Eastside Delta Tributaries Ecological Management Zone and provide durable ecosystem restoration involve developing and implementing watershed management plans by land use agencies and evaluating flood management options.

COSUMNES RIVER PROJECT

The Cosumnes River Project is a multi-agency effort to restore and protect the Cosumnes River ecosystem. The Cosumnes River Project encompasses 37,000 acres including Staten Island, the McCormack-Williamson Tract, and the lower Cosumnes floodplain, vernal pools, grasslands, and blue oak woodland. Partners in this effort include The Nature Conservancy, Bureau of Land Management, County of Sacramento, Department of Water Resources, Department of Fish and Game, State Lands Commission, Ducks Unlimited, Environmental Protection Agency, Wildlife Conservation Board, and the American Farmland Trust. Actions sponsored by the Cosumnes River Project will complement efforts undertaken by the ERPP to restore ecological health of the Cosumnes River Ecological Unit.

CENTRAL VALLEY PROJECT IMPROVEMENT ACT

Restoring and maintaining ecological processes and functions in the Eastside Delta Tributaries Ecological Management Zone will augment other important ongoing and future restoration efforts for the zone. The program proposed by the CVPIA will complement efforts of the USFWS' Anadromous Fish Restoration Program. The goal of the program is to double the average number of anadromous fish that was produced naturally in the system from 1967 through 1991.

CALFED BAY-DELTA PROGRAM

CALFED has funded eight ecosystem restoration projects in the Eastside Delta Tributaries Ecological Management Zone. One of the more significant projects is the design and construction of fish screens and ladders at the Woodbridge Irrigation District diversion on the Mokelumne River.

SALMON, STEELHEAD TROUT AND ANADROMOUS FISHERIES PROGRAM ACT (SB 2261)

The vision will also help the DFG reach its goal of doubling the number of anadromous fish that were produced in 1988.